

## Rice Pest

Generally 4 types of insect are damaged the Rice crop-

- |                                  |                          |
|----------------------------------|--------------------------|
| A. Stem feeder/ Internal feeder. | C. Leaf feeder.          |
| B. Plant sucker.                 | D. Stem and root feeder. |

### A. Stem feeder/ Internal feeder

Sl no	Common name	Scientific Name	Family	Order	Status
1	Rice yellow stem borer (RYSB)	<i>Scirpophaga incertulas</i>	Pyralidae	Lepidoptera	Major
2	Dark Headed Stem Borer (DHSB)	<i>Chilo polychrysa</i>	Pyralidae	Lepidoptera	Major
3	Rice Pink Borer (RPB)	<i>Sesamia inferens</i>	Noctuidae	Lepidoptera	Major

### B. Plant sucker

Sl no	Common Name	Scientific Name	Family	Order	Status
1	Green Leaf Hopper	<i>Nephotettix virescens</i> <i>Nephotettix nigropictus</i>	Cicadellidae	Hemiptera	Major
2	Brown plant Hopper (BPH)	<i>Nilaparvata lugens</i>	Delphacidae	Hemiptera	Major
3	Rice bug	<i>Leptocarisa acuta</i>	Coreidae	Hemiptera	Major
4	White backed plant hopper	<i>Sogatella furcifera</i>	Cicadellidae		Major
5	Zigzag leaf hopper	<i>Recilla dorsalis</i>	Cicadellidae	Hemiptera	Major
6	Rice thrips	<i>Thrips oryzae</i>	Thripidae	Thysanoptera	Major

### C. Leaf feeders

Sl no	Common Name	Scientific Name	Family	Order	Status
1	Rice ear-cutting caterpillar	<i>Mythimna separata</i>	Noctuidae	Lepidoptera	major
2	Rice swarming caterpillar	<i>Spodoptera mauritia</i>	Noctuidae	Lepidoptera	major
3	Rice hispa	<i>Dicladyspa armigera</i>	Chrysomelidae	Coleoptera	major
4	Rice leaf roller	<i>Cnaphalocrosis medinalis</i>	Pyralidae	Lepidoptera	major
5	Rice case worm	<i>Nymphyla depunctalis</i>	Pyralidae	Lepidoptera	major
6	Rice skipper	<i>Parnara guttata</i>	Hesperiidae	Lepidoptera	major

## D. Stem and Root feeder

1. Rice gall midge → *Orseolia oryzae* → Cecidomyiidae → Diptera → major

## Rice yellow stem borer

**Scientific name:** *Scirpophaga incertulas*.

**Family:** Pyralidae.

**Order:** Lepidoptera.

### Pest characters

1. Moths are medium sized and triangular.
2. Larvae are yellowish in colour.
3. Snout like structure present (extension of labial pale).

### Nature of Damage

1. The female insects lay eggs in small clusters on the ventral side of the tip of the leaf.
2. After 6-8 days the eggs are hatched. Newly hatched caterpillars climb down through a silken thread and then enter into the leaf sheath.
3. After a few days the caterpillars bore into the stem and feed on internal soft tissues until they reach to the node. Then they feed tissues around the node.
4. Two parts of the stem detached and finally the central leaf dried out which is called "*Dead heart*". This damage occurs at the vegetative and tillering stage of the rice.
5. When the larvae attack at the booting stage of rice plant, the panicles become dry and looks white. This symptoms is called "*White head*" symptom.

### Control Measures

#### (A) Non-chemical

1. Using light trap for controlling adults.
2. Collection and destruction of egg masses.
3. Collection and destruction of dead plants.
4. Using resistant varieties as BR 1, BR 2, BR 10, BR 11, BR 22 etc.
5. Augmentation of predators (lady bird beetle, tiger beetle, spider, year wig, microvelia etc) and parasitoids (Telenomus, tetrastichus etc).



**(B) Chemical**

1. Using Basudin 10G/ Furadan 3G/ Diginol 146 @ 16.5 kg/ ha.
2. Application of Dimecron/ Bennicron/ Pillarcron 100 SL @ 344 ml/ acre of land.

## Green leaf hopper

**Scientific Name:** *Nephotettix virescence*.

**Family:** Cicadellidae.

**Order:** Hemiptera.

**Pest characters**

1. Both nymph and adult are harmful.
2. Mouth parts → piercing sucking type.
3. Green in colour.

**Nature of Damage**

1. Eggs are laid in rows on the midrib of the leaf sheath.
2. After 3-6 days the eggs are hatched, both nymph and adults are harmful and they can damage by 2 types-

**Direct damage**

1. Both nymph and adults suck the cell sap from leaves of plant.
2. Due to sucking cell sap, the plant conducting tissues become collapsed and as a result plant materials can not move upward.
3. Then the infested plants become yellow and loss vitality and vigour due to lack of photosynthesis.
4. Finally burning symptoms appears in patches in the infested field which is known as "*hopper burn*".
5. They can do damage by lacerating the plant tissues with ovipositor which facilitates microbial infection.

**Indirect damage**

1. GLH cause *Tungro* disease and *yellow dwarf* disease by carrying tungro virus and yellow dwarf virus respectively.
2. Photosynthesis reduction occur this insect secretes honey dew on plants which later help for

production of sooty mould fungus grows. Finally yield reduction occurs severely.

## **Control Measures**

### **A) Non-chemical**

1. Removing excess water from field.
2. Use of excess nitrogenous fertilizer should be avoided.
3. Optimum plant densities should be maintained.
4. Crop rotation should be followed.
5. Cultivation of insect resistant varieties such as BR 1, BR 2, BR 3, BR 10 and BR 26.
6. Destruction of ratoon crops.
7. Using light trap for controlling adults.
8. Trichoparammatic parasitoids *Paracantha andia* can be used.
9. Preservation of damselfly and spider *Chicosa pxudoamdata*.

### **B) Chemical**

1. Application of Malathion/ Maladan/ Zithiol 57 EC @ 404 ml/ acre of land.
2. Application of Sumithion/ Edfan 50 EC @ 404 ml/ acre of land.
3. Using granular insecticides. e.g. Basudin 10G, Furadan 3G @ 16.5 kg/ha.
4. Application of Metasistox @ 1.5 L/ ha.
5. Application of Tapgor or Racion @ 1-2 L/ ha.

## **Brown Plant Hopper**

**Scientific name:** *Nilaparvata lugens*.

**Family:** Delphacidae.

**Order:** Hemiptera.

### **Pest Characters**

1. Brown in colour.
2. Both nymph and adult are harmful.
3. Mouth parts→ Piercing sucking type.



## **Nature of Damage**

1. The female insect lays egg in masses on the leaf sheath of the base of the plant.
2. After 4-11 days the eggs are hatched. Both nymph and adults are confined at the base of the plant and suck cell sap from the stem and leaf. Due to sucking cell sap, the following symptoms may appear-

### **Direct damage**

1. Leaf yellowing and leaf spotting occur.
2. Losses its vitality and vigour.
3. Growth stunted.
4. Reduced number of tiller.
5. Finally, Burning symptoms occurs which is known as hopper burn.

### **Indirect damage**

1. Act as a vector of grassy stunt virus of rice.
2. Photosynthesis reduces due to formation of sooty mould fungus as honey dew secretes on the leaf surface.

## **Control Measure**

### **A) Non-chemical**

1. Use of excess nitrogenous fertilizer should be avoided.
2. Removing excess water from the field.
3. Optimum plant densities should be maintained.
4. Crop rotation should be followed.
5. Cultivation of insect resistant varieties such as BRRI Dhan 31, BRRI 1, 2, 3, 10 etc.
6. Destruction of ratoon crop.
7. Use of predator- Mirid bug, Lady bird beetle, Coccinelid beetle, *Micraspis discolor*.
8. Use of Parasitoids- Trichoparammatic parasitoid- *Paracentrotra andoi*, *Anagras sp.*

### **B) Chemical**

1. Using of Basudin 10G/ Furadan 3G/ Diginol 14G @ 16 kg/ha.
2. Application of Malathion / Maladan 57 EC @ 404 ml/ acre of land.
3. Spraying Symbush/ Ripcord/ Fenon 10 EC @ 600 ml/ha.

4. Application of Metasistox 25 EC @ 1.5 L/ ha.
5. Application of Tapgor/ Racion @ 1-2 L/ ha.

## Rice Bug

**Scientific name:** *Leptocorisa acuta*.

**Family:** Coreidae.

**Order:** Hemiptera.

### Pest characters

1. Medium sized insect.
2. Scutellum present.
3. Scent gland present.
4. Both nymph and adult are harmful.

### Nature of Damage

1. Female insect lays egg on the upper surface on the leaves in rows.
2. After 5-8 days, the eggs are hatched and the nymphs are comes out.
3. Both nymphs and adult's suck the milk or juice from the developing grain in the milky stage of the plant. The attacked grains becomes shriveled or malformed and grain remains unfilled. As a result, yield reduction occurs severely.
4. Fungal infection also occurs in the infested grain. Grain becomes black and bad odour come out which cause a reduction of market value of rice grain.

### Control Measure

#### A) Non-chemical

1. Collection and destruction of nymphs and adults by hand net.
2. Using light trap.
3. Destruction of alternate host.
4. Using predators- Tiger beetle.
5. Rope soaked with kerosene water can drag across the rice field.

#### B) Chemical

1. Application of Malathion/ Maladan 57 EC @ 1 L/ha.



2. Application of Dursban 20 EC @ 1 L/ha.
3. Application of Sevin 85 WP @ 1.7 kg/ha.
4. Application of Marshal 20 EC @ 1.2 L/ha.

## **Rice Hispa**

**Scientific name:** *Dicladispa armigera*.

**Family:** Cecidomyiidae.

**Order:** Coleoptera.

### **Pest characters**

1. Medium sized insect.
2. Elytra with spine, blackish colour.
3. Mouth parts → Chewing type.
4. Both grub and adult are harmful.

### **Nature of Damage**

1. The female insects lays eggs in single at the ventral side of the leaf tip.
2. After 5-8 days the eggs are hatched and the grub are came out.
3. The grub mines the leaf and feed on tissues in between two epidermal layers and make tunnel. The infected leaf become whitish, membranous and finally die. The adult, scrap the chlorophyllous tissues of the leaf and make white streak along the vein. In severe condition the infested leaf becomes papery white and photosynthesis and yield reduction occur severely.

### **Control Measure**

#### **A) Non-chemical**

1. Collection and destruction of adult by using hand net.
2. Using resistant variety. e.g. BR 14, 28, 29 etc.
3. Destruction of alternate host.
4. Both adult and grub infestation can be reduced by leaf clipping, 6-8 cm below from the tip.
5. Destruction of crop residues.

6. Rope soaked with kerosene water drag across the rice field.

## **B) Chemical**

- i. Using Basudin 10G/ Furadan 3G @ 16 kg/ha.
- ii. Spraying with Cypermethrin 10 EC or Phosphamidon 100 EC @ 1.5 ml/L of water.
- iii. Application of Dursban 20 EC @ 1 L/ha.
- iv. Application of Marshal 20 EC @ 1.2 L/ha.
- v. Application of Diazinon 60 EC @ 1 L/ha.
- vi. Application of Sumithion 50 EC @ 404 ml/acre of land.

## **Rice gall midge**

**Scientific name:** *Orseolia oryzae*.

**Family:** Cecidomyiidae.

**Order:** Diptera.

### **Pest characters**

1. Only larvae or maggot is harmful.
2. Cecidogen is secreted by the maggot.
3. Gall formation occur.
4. Adult are bright reddish brown colour.

### **Nature of Damage**

1. The eggs are laid singly at the base of the plant or on the soil.
2. After 4-5 days the eggs are hatched.
3. The newly hatched maggot enters into the leaf sheath and finally reach to the growing point of the plant by feeding. Then the maggot lacerates and irritates the tender tissues and feed on them. Due to secretion of some salt of chemical (Cecidogen) and oval chamber is formed and the infested area eventually gall is formed.
4. Due to formation of gall, a characteristics of long hollow or dirty white pale green tubular structure is formed. Due to physiological change in central leaves, this tubular structure is known as Onion shoot or Silver shoot.
5. Finally the infested plant become stunted and does not produce any ears/ panicles.



## Control Measure

### A) Non-chemical

1. Early planting should be followed.
2. Removal or destruction of onion shoot/ silvery shoot.
3. Avoiding excess use of K fertilizer.
4. Planting time should be informed.
5. Light trap is useful.

### B) Chemical

- i. Using Basudin 10G/ Furadan 3G @ 16 kg/ha.
- ii. Spraying with Cypermethrin 10 EC or Phosphamidon 100 EC @ 1.5 ml/L of water.
- iii. Application of Dursban 20 EC @ 1 L/ha.
- iv. Application of Marshal 20 EC @ 1.2 L/ha.
- v. Application of Diazinon 60 EC @ 1 L/ha.
- vi. Application of Sumithion 50 EC @ 404 ml/acre of land.
- vii. Application of Dimecron/ Bennicron/ Pillarcron 100 SL @ 344 ml/acre of land.
- viii. Application of Lebacid 50 EC @ 1.2 L/ha.
- ix. Application of Diginol 60 EC @ 688 ml/acre of land.

## Rice Caseworm

**Scientific name:** *Nymphyla depunctalis*.

**Family:** Pyralidae.

**Order:** Lepidoptera.

### Pest characters

1. Adult is nocturnal, small, delicate and snowy white colour.
2. Only larvae are harmful and transparent in color.
3. Respiration occurs by filamentous gill.
4. Pupation occurs in the case which is attached with leaf sheath.

## **Nature of Damage**

1. A female moth lays 50 eggs, 10-20 in batches on the underside of leaf floating on water. After 4-5 days the eggs are hatched and young larvae are come out.
2. Damage occurs only by the larvae. The first larvae feeding on the green tissue by scraping on the leaf surface. Then it is move to the tip. Then the larvae makes another cut about 1 cm below the first cut and rolled the margin with silk and tubular case is formed inside which the larvae live. A new case is constructed after every larval moult and the case is hanged with leaf blade.
3. Upper epidermis become papery white and 2-3 cm leaf dry up just below the case.
4. Finally photosynthesis reduced and plant becomes stunted.

## **Control Measure**

### **A) Non-chemical**

1. Using light trap for controlling moth.
2. Drainage of water is an important control measure against this insect.
3. Using kerosene oil in the field water for controlling larvae.

### **B) Chemical**

1. Using systemic insecticides. e.g. Dimecron/ Lebacid @ 0.05 % of the solution.
2. Application of Ripcord @ 500 ml/ha.
3. Application of Cymbush 10 EC @ 500 ml/ha.
4. Using Basudin 10G/ Furadan 3G @ 16 kg/ha.
5. Spraying with Cypermethrin 10 EC or Phosphamidon 100 EC @ 1.5 ml/L of water.
6. Application of Dursban 20 EC @ 1 L/ha.
7. Application of Marshal 20 EC @ 1.2 L/ha.
8. Application of Diazinon 60 EC @ 1 L/ha.
9. Application of Sumithion 50 EC @ 404 ml/acre of land.



## Pest of Sugarcane

Common name	Scientific name	Family	Order	Status
Sugarcane top shoot borer	<i>Scirpophaga excerptalis</i>	Pyralidae	Lepidoptera	Major
Early shoot borer	<i>Chilo infuscaiellus</i>	Pyralidae	Lepidoptera	major
Pink borer	<i>Sesamia inferans</i>	Noctuidae	Lepidoptera	major
Sugarcane Stem borer	<i>Chilo tumidicostalis</i>	Pyralidae	Lepidoptera	major
Root Stock borer	<i>Emmalocera depressella</i>	Pyralidae	Lepidoptera	major
White grub	<i>Holotrichia settcollis</i>	Melolonthidae	Coleoptera	major
Sugarcane Termite	<i>Odontotermes lokanandi</i>	Termitidae	Isoptera	major

## Sugarcane Top Shoot borer

**Scientific name:** *Scirpophaga excerptalis*.

**Family:** Pyralidae.

**Order:** Lepidoptera.

### Pest characters

- i. Adults are milky white in colour.
- ii. Insects found in India, Pakistan and Bangladesh.
- iii. Larvae are also white in colour.

### Nature of Damage

1. It is serious pest of sugarcane.
2. Adult female lays eggs on underside of the leaves in masses which is covered with brown tuft of hair.
3. After hatching the eggs, the young larvae enter into the mid rib of leaf mining there towards the leaf base. From there the larvae enter into the growing point (Spindle) and feed inside.
4. Depending on the age of plant two types of symptoms are developed.
5. When plants are attacked at early stage before cane formation, the central leaf die. The symptom is called "*Dead heart*".
6. When the plants are attacked at later stage (after cane formation) a bunch of leaves develops from

the top of the plant and the symptom is called "*Bunchy top*".

7. If dead heart symptom appears then 100 % loss occur and if bunchy top symptoms occurs then 20 % loss may occur.

### **Control Measure**

#### **A. Non-chemical**

1. Collection and destruction of adults and egg masses.
2. Infestation free setts should be used.
3. Destruction of infected plants.
4. Avoiding of ratooning crop.
5. Excess nitrogenous fertilizer should be avoided.
6. *Trichogramma chilonis* and *Isotima javensis* parasitoids should be released against 3<sup>rd</sup> or 4<sup>th</sup> broods.

#### **B. Chemical**

1. Application of Diazinon/ Diginol 60 EC @ 3 ml/L of water.
2. Application of Curaterr 5G @ 40 kg/ha.
3. Application of Azodrin/ Nuvacron 40 WSC @ 3 ml/L of water.

## **Sugarcane Stem borer**

**Scientific name:** *Chilo tumidicostali*.

**Family:** Pyralidae.

**Order:** Lepidoptera.

### **Pest characters**

Adults are pale brown in colour with white hind wing.

### **Nature of Damage**

1. A female adult lays eggs in masses usually on the under surface of the leaves.
2. Sometimes they lay egg on leaf sheath. After hatching egg, the larvae collectively bores into the stem and feed inside.
3. Depending on the age of the plant, two times of symptoms are developed when plant attacked at early stage (Just after cane formation) the affected plant may die and the symptom may called "dried



top" symptom.

4. But when the plants are attacked at later stage plant usually do not die but suffer from severe damage.

5. The larvae feed inside making tunnel and secondarily Fungal infection may be occurred. As a result the attacked tissues decomposed and the sugarcane become unfit for human consumption.

### **Control Measure**

#### **A. Non-chemical**

1. Collection and destruction of egg masses and infected plants.
2. Planting of borer free setts.
3. Removing the dried tops.
4. Avoid ratoon crop.
5. Use light trap.

#### **B. Chemical**

1. Sett treatment with coal and Agben 50 EC @ 1 ml/L of water.
2. Application with Diazinon/ Diginol 60 EC @ 3 ml/L of water.
3. Application of Sevin 85 SP @ 1.7 kg/ha.
4. Application of Lebacid 50 EC @ 1 L/ha.

## **Sugarcane Root stock Borer**

**Scientific Name:** *Emmalocera depressella*.

**Family:** Pyralidae.

**Order:** Lepidoptera.

### **Pest characters**

1. Adults are pale pink in color.
2. Fore wing pink in colour and hind wing white.
3. Slim and cylindrical in shape.

### **Nature of Damage**

1. Female lays eggs singly on the leaves and stem or ground.

2. After hatching eggs larvae bore into the roots or underground portion of the stem.
3. Depending on the age of the plants, 2 types of damage may occur. When plants are attacked at early stage before cane formation, the central leaves die and the symptom is called "*dead heart*".
4. When the plant attacked at later stage, the weight and sugar content of plant are greatly reduced.

### **Control Measure**

#### **A. Non-chemical**

1. Application of flood irrigation.
2. Destruction of stubbles after harvesting.
3. Avoid ratoon crop.
4. Destruction of infested plant with its roots.
5. Suitable crop rotation should be followed.

#### **B. Chemical**

1. Application of Heptachlor/ Chlordane/ Dieldrin 40 WP @ 1.8 kg/acre of land.
2. Application of Furadan 5G @ 40 kg/ha for 2 times in furrows during the month of March-April.

## **Sugarcane Termite**

**Scientific name:** *Odontotermes lokanandu*.

**Family:** Termitidae.

**Order:** Isoptera.

### **Pest characters**

1. They are social insect, live in colony, wings develops secondarily.
2. The main species of termite are found, they are -
  - i. *Microtermes obesi*
  - ii. *Odontotermes obesus*.
  - iii. *Termes tabrobanes*
3. They live underground but make small earthen mounds or earthen passages that are visible above the ground. Their colony Organization based on a cast system. In a colony their are numerous workers, one queen and a king and good number of complementary forms of true but young males and females.



### Nature of Damage

1. They enter into the setts either into the cut ends or eye buds and destroy the whole setts.
2. If plant attacked at early stage, they feed on roots and also inside the stem. As a result the seedlings may die. If the seedlings do not die, it become very weak with discoloured foliage and little growth of roots developed.

### Control Measure

#### A. Non-chemical

1. Destroying termites nests with queen.
2. Flood irrigation.
3. Avoid crop ratooning.

#### B. Chemical

1. Applying Admire 200 SL @ 1 L/ha.
2. Applying Actara 25 WG @ 300 g/ha.
3. Applying Furadan 5G @ 6.8 kg/acre of land.
4. Application of Tolstar 2 WP @ 10 kg/ha.

## Pest of Jute

Common name	Scientific name	Family	Order	Status
Jute hairy caterpillar	<i>Spilarctia oblique</i>	Arctiidae	Lepidoptera	Major
Jute semilooper	<i>Anomis sabulifera</i>	Noctuidae	Lepidoptera	major
Jute stem weevil/ Jute apion	<i>Apion corchori</i>	Curculionidae	Coleoptera	major
Jute Red mite	<i>Tetranychus bioculatus</i>	Tetranychidae	Acarina	major
Jute White mite	<i>Hemitarsonemus latus</i>	Tarsonemidae	Acarina	major

## Jute Hairy caterpillar

**Scientific name:** *Spilarctia oblique*.

**Family:** Arctiidae.

**Order:** Lepidoptera.

### Pest characters

- It is a polyphagous pest with wide range of host plant including jute, groundnut, vegetables and ornamental plants.
- Adults are stout moths having black spotted and pinkish coloured wings dotted with small black spots.

### Nature of Damage

1. It is a serious pest of jute. When jute plant become 2-3 feet height, they are attacked by it upto harvesting.
2. Females lay eggs to the lower surface of the mature leaves. After hatching of eggs, the young caterpillars feed on chlorophyllous tissues from lower surface of leaves.
3. Affected leaves become membranous. First to third instar caterpillars spread out to the entire field and feed on whole leaf tissues leaving only the ribs.
4. Once caterpillars swarm, there is nothing without stem. They are polyphagous.
5. Besides jute they attack soybeans, groundnut, maize, linseed, mashkalai, radish etc.

### Control Measure

#### A) Non-chemical

1. Collection and destruction of egg masses and caterpillars at early stage.
2. Use of light trap for controlling adults moths.
3. Ploughing of land after harvesting.
4. Digging trench surrounding infested field and killing them.
5. Application of biological control.
6. Spraying of microbial insecticides. e.g. *Bacillus thuringiensis*.

#### B) Chemical

1. Application of Sevin/ Diazinon/ Diginol 60 EC @ 3 mL/ L of water.
2. Application of Ripcord/ Cymbush/ Fenon 10 EC @ 1 mL/L of water.
3. Application of Azodrin/ Nuvacron 40 WSC @ 3 mL/L of water.



## Jute Semilooper

**Scientific name:** *Anomis sabulifera*.

**Family:** Noctuidae.

**Order:** Lepidoptera.

### Pest characters

- Larvae are called semiloop when cause damage.
- Body colour green, no hair present.

### Nature of damage

1. Jute Semilooper is a serious pest of jute. Female insects lay eggs singly on the lower surface of the young leaves.
2. After hatching of eggs, caterpillar feeds on apical leaves and buds (1<sup>st</sup> to 9<sup>th</sup> leaves).
3. As a result, plant growth adversely affected and yield greatly reduced.

### Control Measure

#### A) Non-chemical

1. Brushing the top of the plants with a long rope soaked in kerosinized water.
2. Ploughing the infested field after harvesting.
3. Following suitable crop rotation.
4. Encouragement of insectivorous birds.

#### B) Chemical

1. Application of Sevin/ Diazinon/ Diginol 60 EC @ 3 mL/L of water.
2. Application of Ripcord/ Cymbush/ Fenon 10 EC @ 1 mL/L of water.
3. Application of Azodrin/ Nuvacron 40 WSC @ 3 mL/L of water.

## Jute Stem Weevil/Jute Apion

**Scientific name:** *Apion corchori*.

**Family:** Curculionidae.

**Order:** Coleoptera.

### Pest characters

- Body Covered with hard Elytra.
- Snout present.

### Nature of Damage

It is a serious pest of jute. It attacks the jute plants from seedling to harvesting.

1. Adult female bore into a hole with snout in young seedlings in the apical portion of the stem. Near the base of petiole female lay eggs in the axial singly.
2. After hatching eggs, grubs feed on vascular bundle inside the stem and ultimate result withering of shoots. This causes a relation of the length of the Fiber.
3. Different destruction symptoms may occur depending on the age of plant. If plants attacked at seedlings stage, they become die.
4. If the plants are older, as a result of injury a mucilaginous substance exudates then a hard structure develop. They are known as knot or gira or chok which prevent rotting of jute.
5. Adult weevil only bore into the leaves and cannot cause serious damage.

### Control Measure

#### A) Non-chemical

1. Roughing of infested plants during early crop season.
2. Destruction of stubble after harvesting.
3. Encouragement of *olitorious* jute cultivation.

#### B) Chemical

1. Application of Sevin/ Diazinon/ Diginol 60 EC @ 3 mL/ L of water.
2. Application of Ripcord/ Cymbush/ Fenon 10 EC @ 1 mL/L of water.
3. Application of Azodrin/ Nuvacron 40 WSC @ 3 mL/L of water.



## Pest of Cotton

Common name	Scientific name	Family	Order	Status
Pink bollworm	<i>Pectinophora gossypiella</i>	Gelechiidae	Lepidoptera	Major
Spotted bollworm	<i>Earias vittella</i>	Noctuidae	Lepidoptera	Major
Red cotton bug	<i>Dysdercus cingulatusi</i>	Pyrrhocoridae	Hemiptera	Major
Cotton aphid	<i>Aphis gossypii</i>	Aphididae	Hemiptera	Major

## Pink Bollworm

**Scientific name:** *Pectinophora gossypiella*.

**Family:** Gelechiidae.

**Order:** Lepidoptera.

### Pest characters

- Moths flies at night and sight of night.
- Adults are tining and dull in colour.
- Antenna filiform type.
- The moths lay eggs alone or groups.
- The larvae start eating into the boll from the top to downward.

### Nature of Damage

1. It is a serious pest of cotton. It attacks cotton when plant at time at bearing stage.
2. A female moths lay eggs singly or in batch on the underside of the leaves, buds, flower or in green bolls.
3. After hatching the eggs, larvae enters into the flower, buds or into the green bolls.
4. When flowers are infested due to the feeding of inside a characteristics symptoms produced called "Rosette bloom". Such flowers, buds fail to develop boll.
5. When green bolls are infested firstly the whole of the entry close down, but the larvae continue feeding inside on the seed kernel.
6. The attacked boll fall down permanently which grows mature don't contain good gining and seed oil content also reduced.

## Control Measure

### A) Non-chemical

1. Field sanitation after harvest.
2. Deep Ploughing after harvest.
3. Early sowing and harvesting.
4. Sun drying of cotton seed.
5. Fumigation of cotton seed.

### B) Chemical

1. Using systemic insecticides. e.g.
  - a) Diazinon 60 EC @ 1.68 L/ha.
  - b) Sevin 80 WP @ 22 L/ha.
  - c) Ripcord/ Cymbush/ Fenon 10 EC @ 1.2 L/ha.

## Spotted Bollworm

**Scientific name:** *Earias vittella*.

**Order:** Lepidoptera.

**family:** Noctuidae.

### Pest Characters

- The moths are tiny.
- The hind wing of both species is white.
- Broad, green, tripe across the length of the fore wing.

### Nature of Damage

They lay eggs singly on shoots, small leaf, flowers bud and plant tops. Egg hatch between 4-5 days, newly hatched caterpillars enter into the growing shoot and feed inside the vascular bundle and check translocation of food. Affected shoot wither and die, at later stage of the plant they enter either into the flowers bud or into the green boll. When flower buds are infested due to the feeding their inside, a characteristics symptoms is produced called "flared squire" afterwards fall down. When green bolls are infested firstly, the hole of the entry closes down but the larvae feeding inside the seed kernel. The attacked boll fall down prematurely which grow mature do not contain good lint and the seeds oil content is reduced.



## Control Measure

1. Field sanitation after harvest.
2. Avoid use of nitrogen fertilizers at the reproductive stage.
3. Early sowing and early harvesting.
4. Use resistant varieties.
5. Collection and destruction of infested bolls.
6. Release egg parasitoid *Trichogramma chilonis*, *T. brasiliensis*, and larval parasitoids *Chelonus blackburni* or *Bracon brevicornis* or *Apanteles* sp. at 35 to 70 days.
7. Using systemic insecticides. e.g. Diazinon 60 EC @ 1.68 L/ha, Ripcord/ Cymbush/ Fenon @ 1.2 L/ha.

## Mustard Aphid

**Scientific name:** *Lipaphis erysimi*.

**Family:** Aphididae.

**Order:** Hemiptera.

### Pest characters

1. Aphid are small, soft-bodied, pearl-shaped insects that have a pair of cornicles (wax-secreting tubes) projecting out from the fifth or sixth abdominal segment.
2. Light green to dark blackish green insect.

### Nature of Damage

1. Mustard aphid plays the key role in destruction the oil seed.
2. Clusters of nymph and adults may be seen on the tender leaves, flower, stocks and pods. Sucking the cell sap and giving out honey dew.
3. The infested leaves turn on yellowish pale and acquire a curly appearance and ultimately the flowers fail to form pods.

## Control Measure

### A) Non-chemical

- 1) Set up yellow stick trap to monitor aphid population.
- 2) Destroy the affected parts along with aphid population in the initial stage.

- 3) Predatory bird *Motacilla cospica* is actively feeding over aphids in February-March.

## **B) Chemical**

1. Spraying Malathion/ Diazinon.
2. Spray the crop with one of the following in the flowering stage; oxydemeton methyl, dimethoate @ 625 - 1000 ml per ha.

# **Groundnut Stem borer**

**Scientific name:** *Sphenoptera perotetti*.

**Family:** Buprestidae.

**Order:** Coleoptera.

## **Pest characters**

- 1) Adults 10-12 mm in length.
- 2) They are generally dark brown in colour with a strike metallic shine.

## **Nature of Damage**

1. The beetles prefer to lay it's eggs on branches.
2. The young creamy white grubs bore into the branches, then the larval tunnel increases in length as the larvae grows in size and ultimately reach the top root.
3. The grubs bore into the stem and root and cause damage by feeding inside root and stem resulting in plants death.

## **Control Measure**

### **A) Non-chemical**

1. Cutting and destroying the infested branches along with grubs is a direct advice for their control.
2. Using of Systemic insecticides.

### **B) Chemical**

1. Apply malathion 5D (or) endosulfan 4D (or) carbaryl 10D at 25 kg/ha to the hole or furrow prior to the sowing.
2. Repeat the same on 40 DAS during earthing up and gypsum application.



# **Forest Pest**

## **Termite (White ant)**

**Order:** Isoptera.

**Family:** Termitidae.

### **Species**

1. *Microtermes obesi*.
2. *Odontotermes obesus*.
3. *Termes taprobanses*.

### **Pest character**

They are social insect and their colony Organization based on a cast system. In a colony there are numerous workers, one queen and a king and good number of complementary forms.

### **Nature of Damage**

Termite is widely distributed. In nursery, this pest attacks the plant from the time of seed germination that of transplanting. Much of the subsequent termite, attack on transplants is due to injury to the roots at the time of lifting. Termites first attack the dead root can continue to feed living tissue when the resistant of the plant is lowered. Attacking young plant show the outer leaves drying up, which could be easily removed at this stage.

### **Control Measure**

1. Nursery first to be cleaned. The termite nest should be locate and destroyed them mechanically.
2. The use of wood ash heaped around the base of tree trunks, or mixed into seedling bedding soil, is reputed to reduce termite attack.
3. Current termite control methods rely largely on the use of persistent organochlorine (cyclodine) insecticides.